

A Multi-Pronged View to a Rural & Regional Career

New developments in technology are continuously opening up possibilities for individuals to have a career in regional Australia that spans far more than just traditional agriculture. The demand for people who have the skills to understand technology and data it creates in ways that it can be used for government and private business models¹ will be enormous over the next decade.

The key enablers for this change are:

1. Huge and ongoing reductions in the costs of technology including storage, sensor and computing technology driven by Moore's Law² and other technology innovations. For instance, the latest NVIDIA GPU chip, the Teslas P100 has 15 billion transistors³. This means that the cost of collecting, storing, and computing data is rapidly falling. When costs are lower for innovation and business cases then applications which were previously unthinkable become possible.
2. Increasing connectivity in regional areas. A combination of the NBN rollout (<http://www.nbnco.com.au/learn-about-the-nbn/rollout-map.html>) coupled with local wireless connections, and the SkyMuster Satellite service (<http://www.nbnco.com.au/learn-about-the-nbn/rollout-map.html>) mean we are seeing rapid improvements in data download speeds in regional areas.
3. Rapid improvements in drone technology, including open source drone efforts designed to reduce costs and increase usability (<https://www.dronecode.org/>). A Bank of America Merrill Lynch Global Research⁴ report has predicted that ***"The agricultural drone market has the potential to generate an additional 100,000 jobs in the U.S. and \$82 billion in economic activity between 2015 and 2025"***. Rapid improvements in drone technology is possible because many of the components of drones, including camera systems are built on top of the global supply chain for smartphones and tablets, increasing the speed of the cost learning curve⁵ due to the massive volumes involved.
4. Developments in machine learning that allow us to make sense of the volumes of data that will be generated as we move to collect much more information on the world around us. Data generation and machine learning are interactive with each other in the sense that training and testing artificial intelligence systems based on machine learning requires large data sets. Artificial intelligence systems that augment our cognitive capacities allow us to perform tasks that impossible for human beings operating by themselves.

¹ Defined as how do you create, deliver and capture value. On this basis every organisation and network has a business model, including government organisations and not for profit organisations.

² https://en.wikipedia.org/wiki/Moore%27s_law

³ <http://venturebeat.com/2016/04/05/nvidia-creates-a-15b-transistor-chip-for-deep-learning/>

⁴ <http://www.marketwatch.com/story/how-drones-will-drastically-transform-us-agriculture-in-one-chart-2015-11-17>

⁵ http://wps.pearsoned.co.uk/wps/media/objects/8970/9185376/65767_30_Suppl.pdf

If we look at three possible examples of the use of technology and data in regional areas in Australia, then we can see how they can be interconnected:

Drones as a Service (DaaS) for Agriculture

Drones for agriculture allow us to move to the next phase of precision agriculture where we can examine crops and pastures in much finer detail than satellite systems allow, and with more frequency than measurement via farm machinery. Early farm adopters of drone technology say current systems are difficult to use and program. It is a common model for technology development that the technology moves from innovation, through to custom built systems, then to industrial models of products and finally to the system as a service. If we think about computing technology it grew from innovation, into computer clubs that built their own models, to industrialised models that gave rise to companies like Dell, and finally to Amazon supply computing services you can just access by plugging into the internet. In the end you do not own anything and the systems become more and more user friendly and reduce the costs of supplying the service. Improved usability and reduced cost increases the pool of potential customers and drives customer demand, further reducing costs.

If we think about drone technology, then it has two major components. The first is the unmanned aerial vehicle and associated camera technology. The second is the software/artificial intelligence systems that allow us to create value from the data that is collected. In the future I imagine both of those being supplied as a service. In practice that looks like small local automated or semi-automated drone “airports” where farmers will be able to request a drone for a particular service via their smartphone or voice activated interactive system just like people in the city can order an Uber service. You can also imagine this being automated where a service provides for automatic monitoring of a certain crop in prescribed ways and time intervals that would be varied depending on weather conditions and data from previous collections.

Whenever the drone docks back into its “airport” the data it collects would be downloaded on to the system. In an ideal future this data would be shared to allow greater value to be generated from all of the data that is being collected around the country. I favour a model where the farmer has the power to decide who can access the data but there are incentives for sharing with others and into the research system in particular. Surrounding the drone platform there will also be an ecosystem or providers that will be able to be accessed in a competitive market. Farmers would choose the business model and supplier(s) that suits their business needs.

Decentralised Energy Grids

Models are already emerging of the creation of energy exchange grids where individuals trade the energy they produce through renewable systems rather than just feeding that energy back into the grid. Tied to rapidly reducing costs of renewable energy production and battery storage the possibilities in this market seem to be very promising. A number of these models have been started in regional Australia already. An example of a more advanced trading network is in Brooklyn New York (<http://transactivegrid.net/>) where “combination of software and hardware that

enables members to buy and sell energy from each other securely and automatically, using smart contracts and the blockchain”.

These models are driven by people that can understand the technology and the capacity to utilise the data created to produce the best outcome for all community partners.

Aged Care Facility Management

In regional areas one of the big issues is allowing the elderly to live in facilities that allow them to “age in place” in the communities where they have connections and family. In the future I can imagine a regional town and its surrounding areas having everyone over 55 issued with data collecting wearable technology like the Fitbit and other systems people already wear but with increased data collection capacities. If the aged care facilities can access this data, then they can understand the fitness and health patterns and trends of all the people that are likely to need their services in the future. They can advise people on where they are relative to others of a similar age, sex, and cultural profile. They supply services that can improve their fitness and health in order or maximise the length of their independent or assisted living circumstances. These would show people where they are on various trend curves and the consequences of being below the average curve and what they can do about changing what is happening within biological limits. It will be an extension of the sort of systems that professional sporting teams are already using to monitor and manage players, especially at the later stage of their careers.

They can also use the data to plan future throughput and capital expenditures because the information will give them a much greater capacity to understand the future of all the potential customers in their region. Obviously there are wider implications for the health system, interaction with rural medical practitioners, health insurance systems, etc.

If we just take these three examples and look at the skills that will be needed, then some are specific and some are generic. The major challenge with the masses of data that we will collect in the future is turning it in to something that is useful for people in their daily lives or their businesses. This will require deep understanding of the people or their business. So you will not be able to just move from servicing farm businesses one day to servicing an aged care facility the next. However, the opportunities are at two levels:

- To be involved in a service business that provides services to a range of industries based on combining technical expertise and industry specific consultants.
- To build a career on technical capacity that is flexible enough for you to learn new skills in new industries and change jobs as industry cycles and profitability changes.

While some of the services will be able to be supplied remotely there will be a critical need for “on the ground” people in the regions to provide technical and business service support. To paraphrase Malcolm Turnbull there has never been a more exciting time for a young person to be developing skills for a career in regional Australia. I wish I was 30 years younger!